

S 7825- R/Sr

WHAT IS CLAIMED IS:

1. A gas permeable probe for use in an optical analyzer for an exhaust gas stream flowing through a duct or chimney, the probe comprising:
- an elongate hollow structure having first and second ends and a side wall, with an optical cavity defined between said first and second ends within said side wall,
 - a filter forming part of said elongate hollow structure,
 - a mounting structure at said first end and adapted for mounting said elongate hollow structure within said duct or chimney,
 - an optical window at said first end permitting a light beam originating from an optical analyzer to enter into said optical cavity to travel from said first end to said second end,
 - a retroreflector provided at said second end for returning said light beam to said first end of said hollow structure, and
 - a tube disposed within said mounting structure and having first and second opposite ends, said first opposite end being located remote from said first end of said elongate hollow structure and being closed by a first window adapted to transmit said light beam from an optical analyzer into the tube and said second end of said tube being closed by a second window adapted to transmit said beam of light from said tube into said optical cavity and said returned light beam from said optical cavity into said tube, said tube thereby defining a closed cavity, said closed cavity being one of an evacuated cavity and a cavity containing a neutral gas.

2. A gas permeable probe in accordance with claim 1, said second window being formed by said optical window.
3. A gas permeable probe in accordance with claim 2, said mounting structure comprising a first mounting flange at said first end of said elongate hollow structure, said first mounting flange containing said optical window, the probe further comprising a mating flange secured to said second opposite end of said tube and sealingly connected to said first mounting flange.
4. A gas permeable probe in accordance with claim 4, there being a ring shaped connecting member between said first mounting flange and said mating flange and a ring heater disposed around said connecting member, said mating flange being connected to said connecting member and said first mounting flange being connected to said connecting member.
5. A gas permeable probe in accordance with claim 4, there being respective seals between said mating flange and said ring heater, between said ring heater and said connecting member, between said connecting member and said first mounting flange and between said first mounting flange and said optical window.
6. A gas permeable probe in accordance with claim 1, said mounting structure comprising a first mounting flange at said first end of said elongate hollow structure, a second mounting flange adapted for mounting to a wall of said duct of chimney and a support tube extending from said second mounting flange to said first mounting flange.

7. A gas permeable probe in accordance with claim 6, there being a carrier for an optical analyzer extending away from said second mounting flange at a side of said second mounting flange remote from said first mounting flange to a third mounting flange at said first opposite end of said tube, said third mounting flange being adapted for the attachment of an optical analyzer positioned outside of said duct or chimney.
8. A gas permeable probe in accordance with claim 7, wherein a housing is provided on said carrier for said optical analyzer and contains at least one of:
 - a power supply including a lead for at least one heater associated with said gas measurement probe,
 - a regulating circuit for regulating an operation of said at least one heater,
 - at least one gas supply line for supplying at least one of a calibration gas, a neutral gas and a filter cleaning gas to said optical cavity,
 - at least one pressure sensing line for sensing an operating pressure in or adjacent to said optical cavity,
 - at least one temperature sensing line for sensing an operating temperature in or adjacent to said optical cavity.
9. A gas permeable probe in accordance with claim 8, wherein an intermediate space is formed between said support tube and said tube and all lines and leads associated with said gas measurement probe and extending to said first end of said elongate hollow structure or beyond said first end are routed through said intermediate space.